Making Cogeneration Pencil Out:

Anaerobic Co-Digestion of Grease Trap Waste

Pacific Southwest Organic Residuals Symposium

October, 2008

Chevron

DWR CORP

Kennedy/Jenks Consultants

Engineers & Scientists

Presentation Snapshot

- Project Background
- Data from first 12 months of operation
  - Reduced solids production
    - ~30% weight reduction
  - Improved solids dewaterability
    - Increase cake density, reduced polymer usage
  - Electricity production
  - Digester stability

Project Background & Update

- 2004 project planning started
- January 2007 Grease receiving started
- September 2008 nearing 1 million gallons received

How much did it cost?

- Total project cost ~$5.5 M
  - Base cogen facility ~$1.9 M
  - Switchgear upgrade ~$0.7 M
  - Grease receiving station ~$0.7 M
  - CNG storage facility ~$0.7 M
  - Digester mixing ~$1.5 M

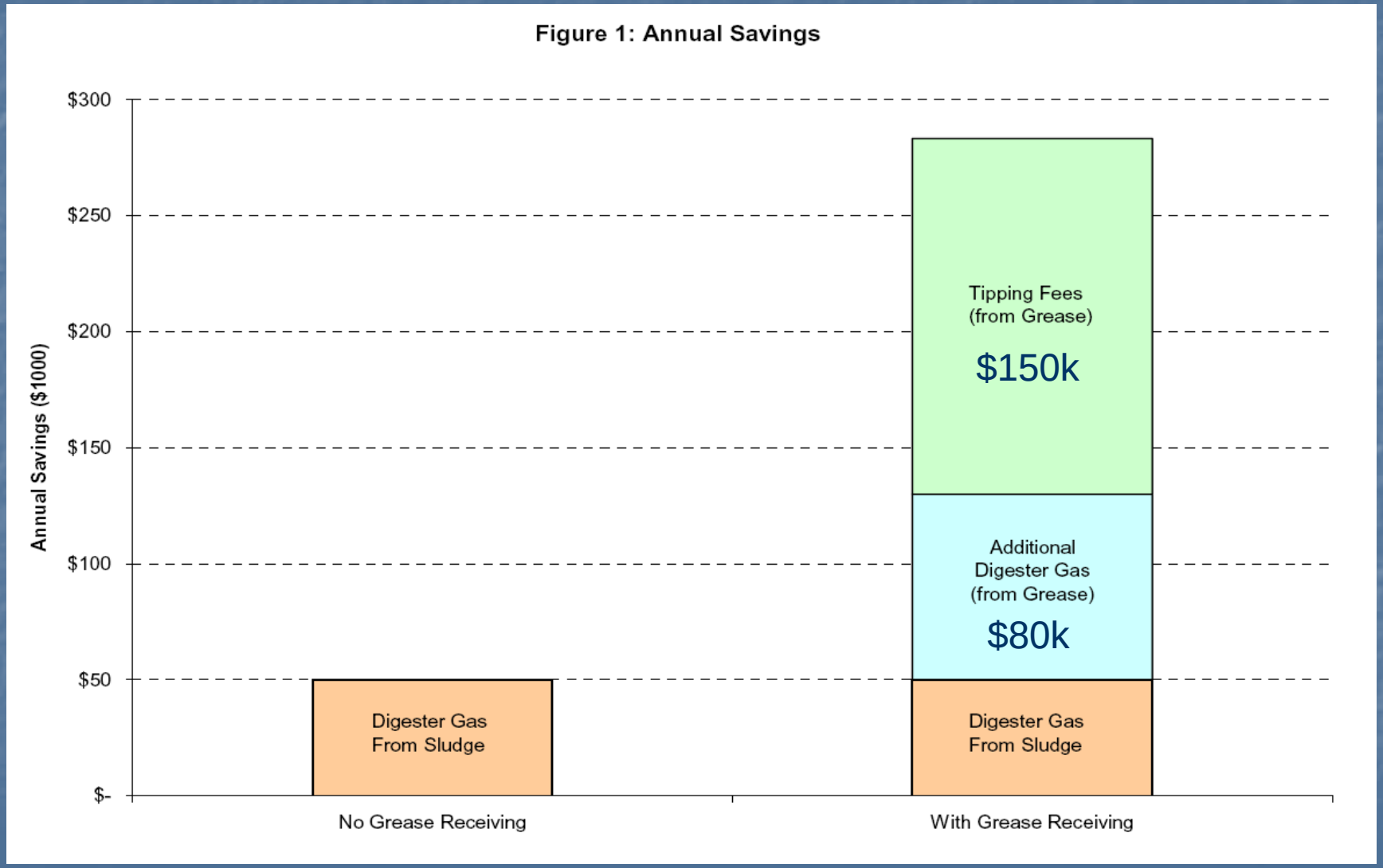
Why Consider Grease Receiving?

- Economics
  - Additional digester gas produced
  - Additional revenue from tipping fees
    - Between $0.10 to $0.18 per gallon
- Provide Environmentally Sound Disposal Option for Haulers

Anticipated Power Production

- 60 kW from sludge
- 100 kW from grease trap waste
- (-) 25 kW for gas treatment and comp.
- 135 kW net production
  - ~$120,000/year in energy savings

Economic Benefits



Environmental Benefits

- Reduced carbon footprint
  - US Average - 1.55 lbs of CO_2 per KWh[1]
- Opportunity for Waste Diversion
  - Food processing waste
  - Food scrap waste

[1] http://www.energystar.gov/index.cfm?c=energy_awareness.bus energy_use#conversions

Millbrae WPCP

Project Assumptions

- Will receive ~3000 gallons per day
- Grease content = ~18%
- Volatile solids destruction = 65%
- Gas production = 15 CF/lb VS destroyed
- Methane Content = 60%
- Cost of electricity = $0.138/kWh
- Tipping Fees:
  - $0.14 per gallon
  - $25 dump fee

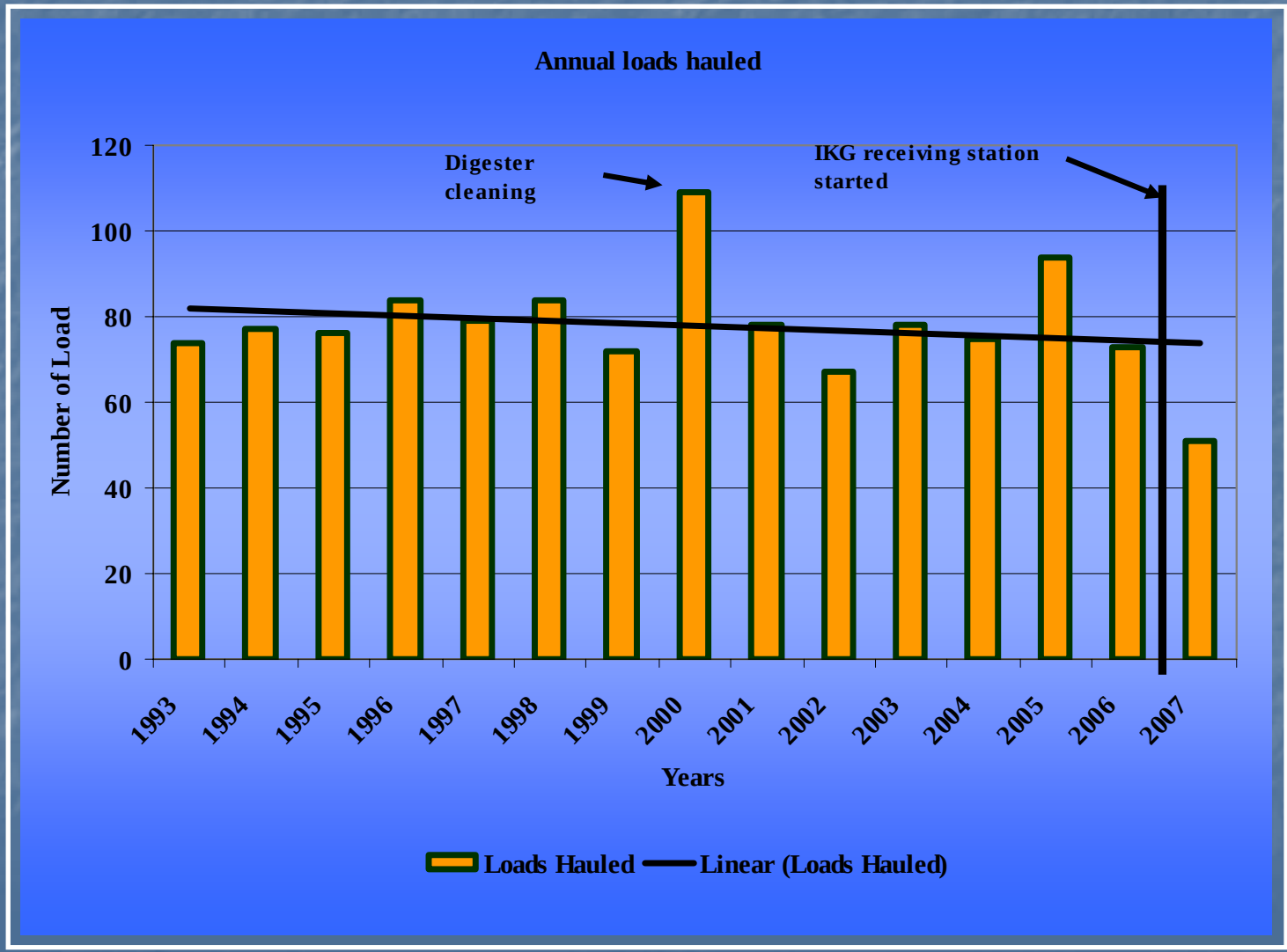
Project Facts

- Gas Quality
  - H2S level < 1 ppm
  - Siloxane level < 70 ppb
- Digester Capacity = ~1 MG
- Existing loading 2800 lbs VSS/day
  - 0.022 lbs VSS/cu. ft digester volume

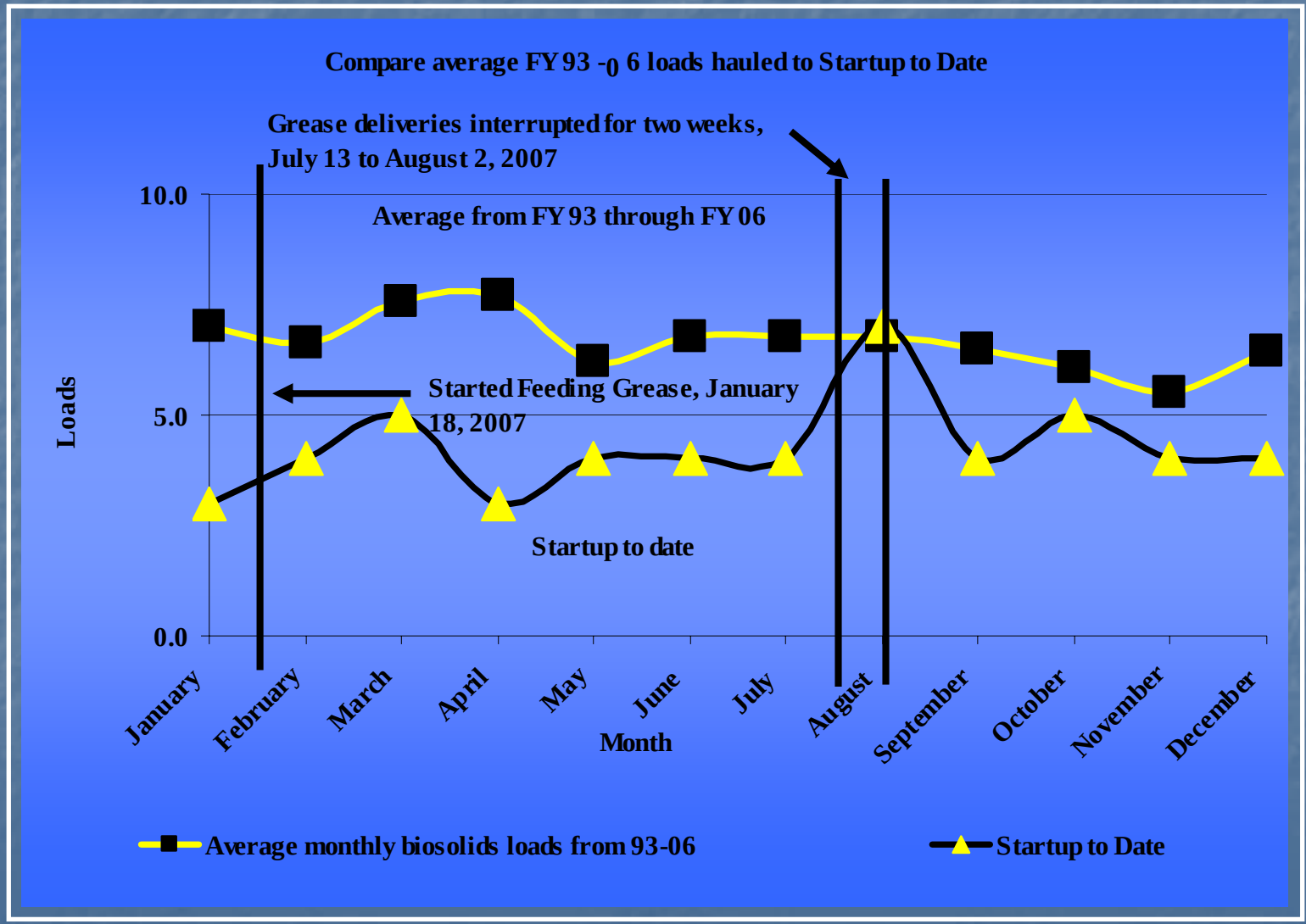
Anticipated VS Load

- VS from sludge = 2800 lbs/day
- VS from grease trap waste = 4500 lbs/day
- Digester loading = 0.057 lbs VS/cu. ft./day
- Other Digester Loadings
  - Textbook = 0.10 – 0.30 lbs/cu. ft./day (pump mixed)
  - SBSA = 0.10 - 0.13 lbs/cu. ft./day (pump mixed)
  - North San Mateo = 0.15 lbs/cu. ft./day (pump mixed)
  - San Leandro WPCP = 0.18 lbs/cu. ft./day (pump mixed)

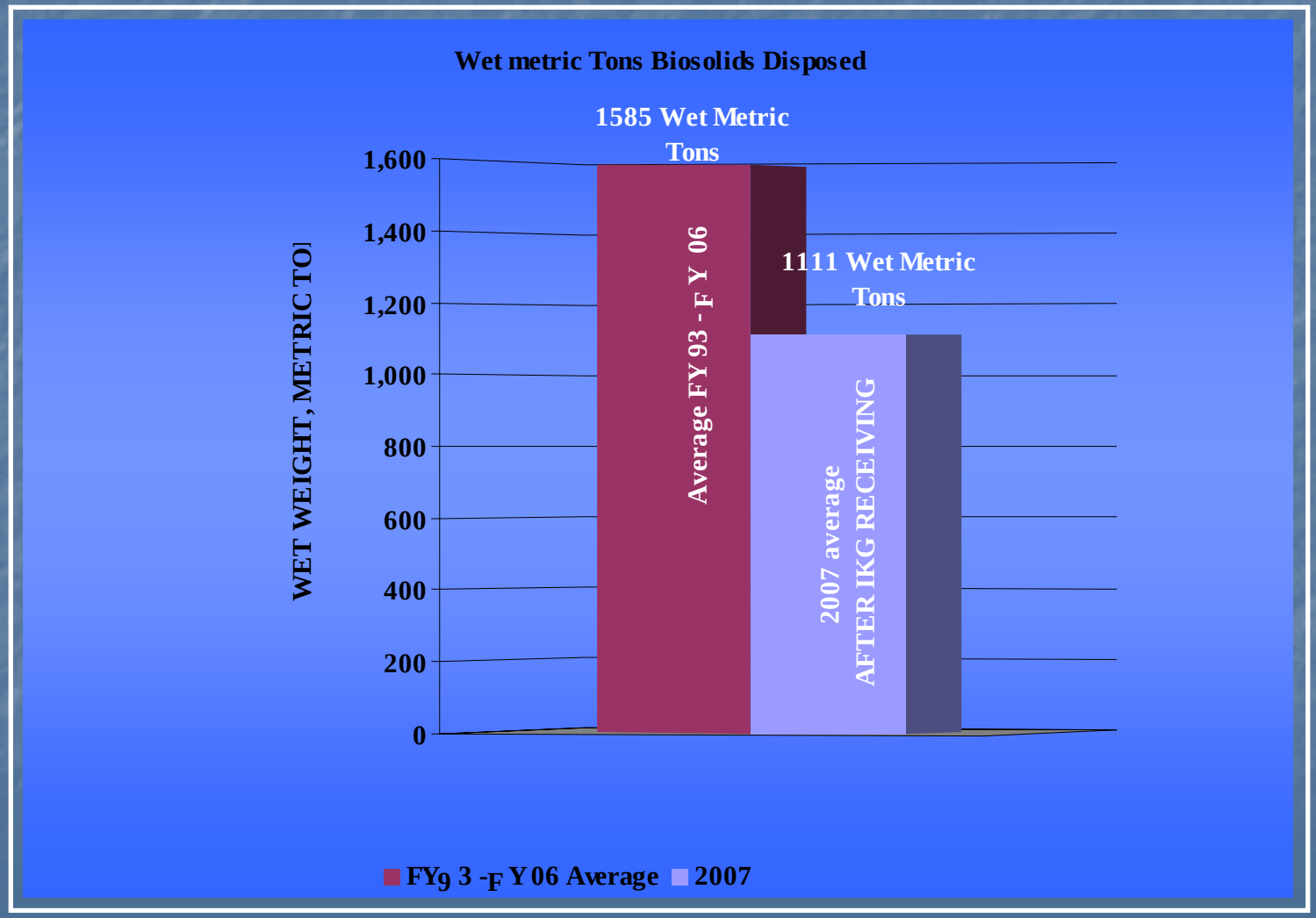
Reduced Solids Production



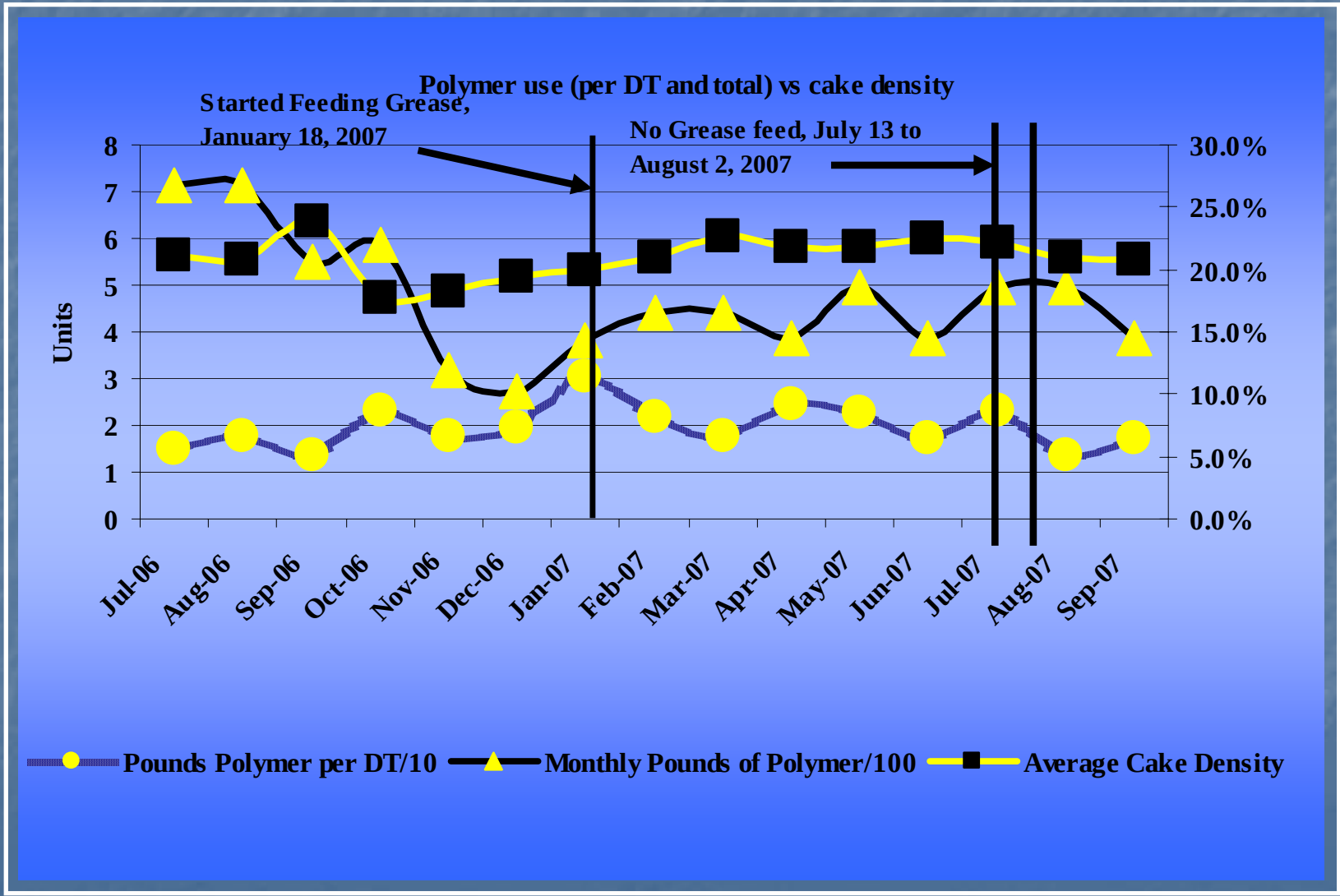
Reduced Solids Production



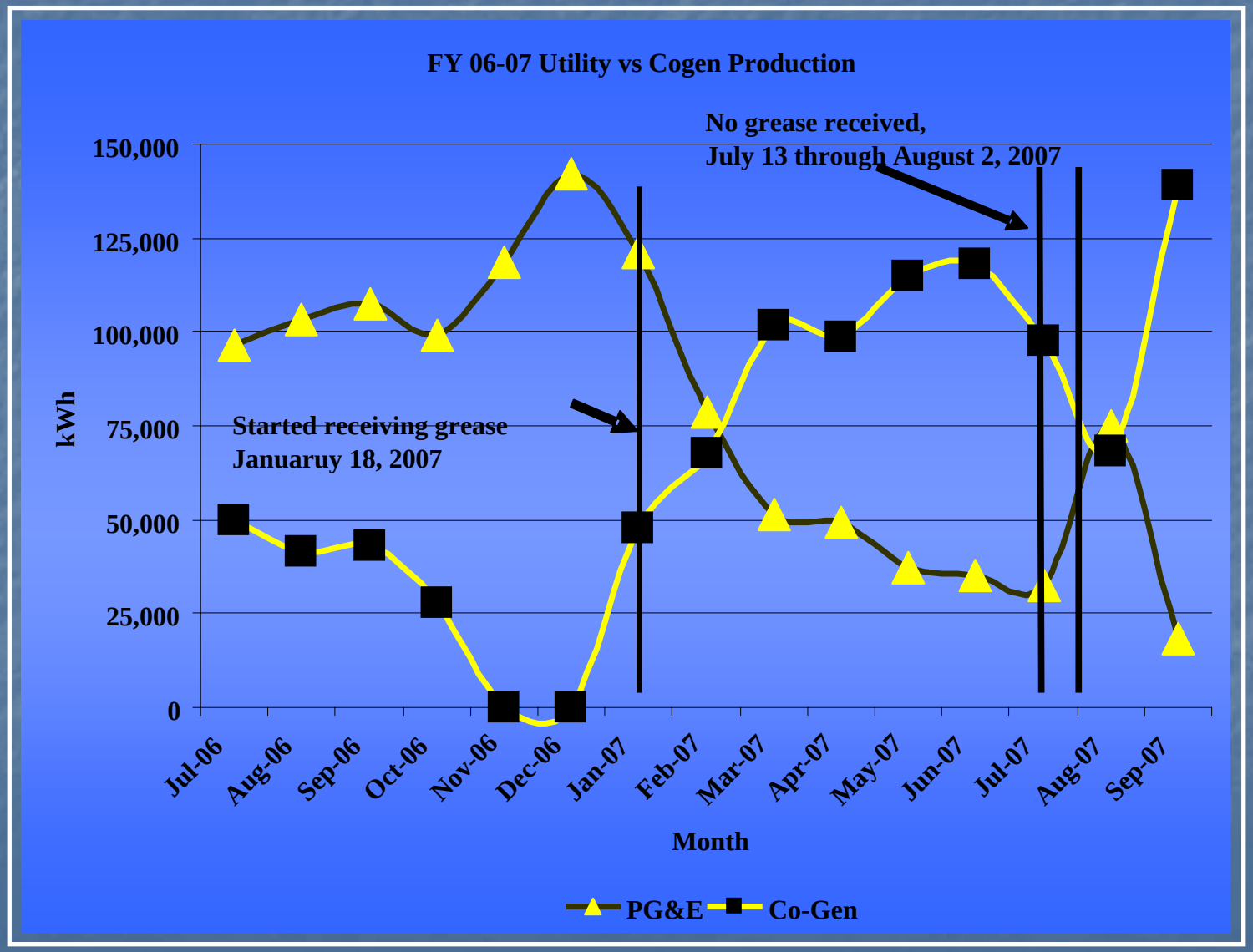
Reduced Solids Production



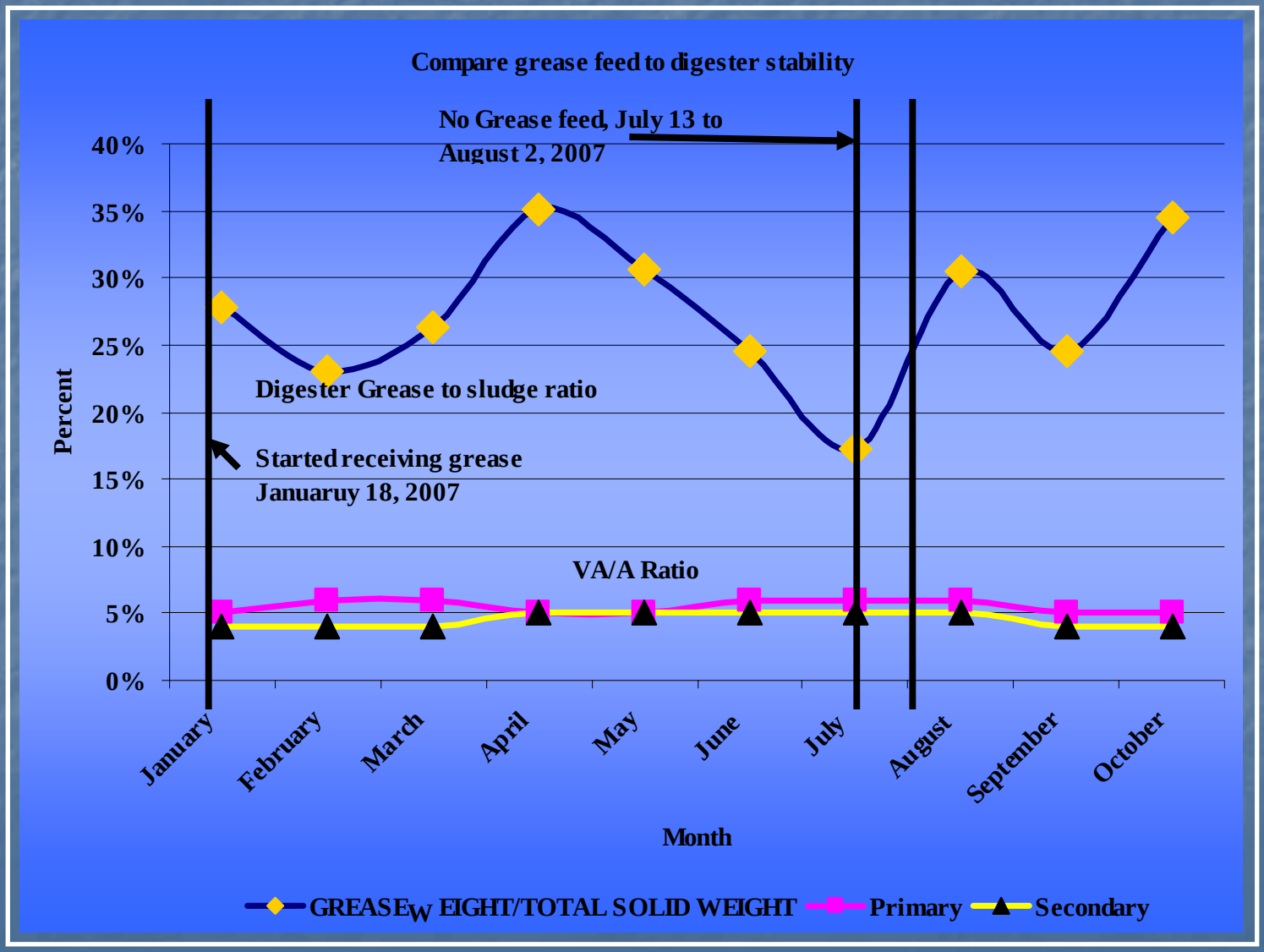
Improved Dewaterability

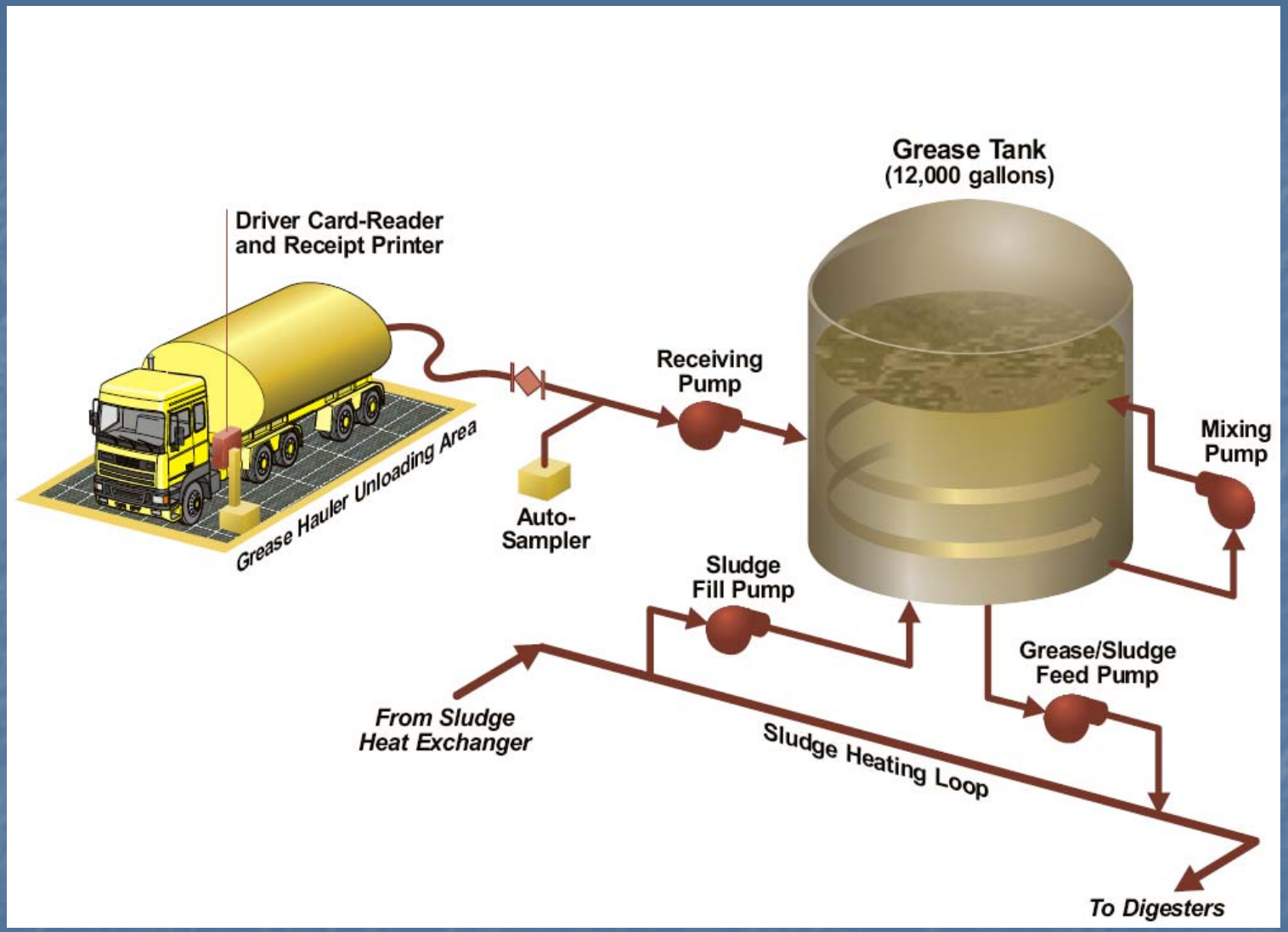


Power Production



Digester Stability




Grease Tank
(12,000 gallons)
Driver Card-Reader
and Receipt Printer
Receiving
Pump
Mixing
Pump
Grease Hauler Unloading Area
Auto-
Sampler
Sludge
Fill Pump
Grease/Sludge
Feed Pump
From Sludge
Heat Exchanger
Sludge Heating Loop
To Digesters


Putting Waste
to Work


CAUTION

Thank You

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